US Army Corps
of Engineers
Northwestern Division

Integrated Water Management of the Columbia River

Presented by

James D. Barton

Chief, Water Management Division

US Army Corps of Engineers
Northwestern Division

COLUMBIA RIVER BASIN

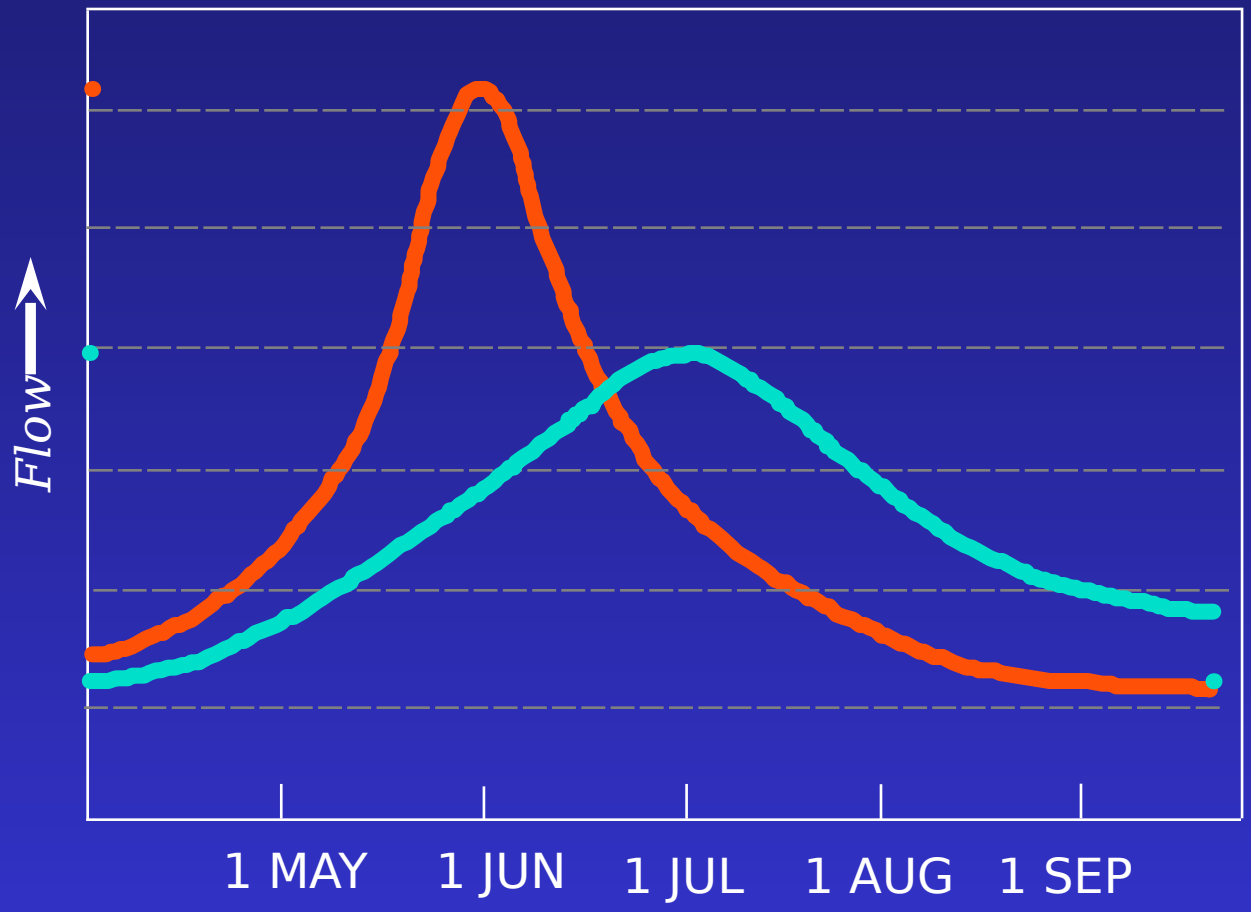
US Army Corps of Engineers
Northwestern Division

COLUMBIA BASIN STATISTICS

- Approximately 259,000 Square Miles at the mouth
- Projects Control only about 25% of the Basin Area
- Average Annual Runoff at The Dalles is approximately 156 MAF
- Storage Capacity in the Columbia Basin is 40 MAF total (only 30 MAF available for flood control)
- 60 major dams, over 100 smaller dams
- Operated as a coordinated system

US Army Corps of Engineers
Northwestern Division

COLUMBIA RIVER HYDROGRAPH



US Army Corps
of Engineers
Northwestern Division

OPERATED FOR MULTIPLE USES

- FLOOD CONTROL
- HYDROPOWER
- RECREATION
- NAVIGATION
- IRRIGATION
- FISH AND WILDLIFE

US Army Corps of Engineers
Northwestern Division

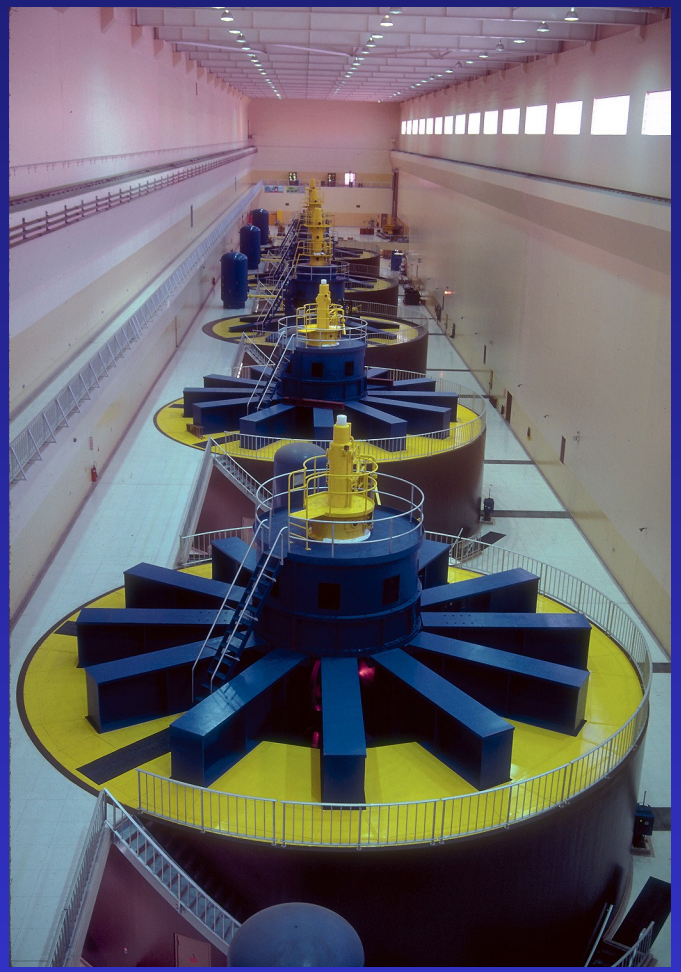
FLOOD CONTROL

- The Corps has unique responsibility in the region for flood control. This includes Federal, Non-Federal and Canadian Projects.
- Maximum system flood control storage is only about 25% of flow
- Key damage center is the Portland, Oregon-Vancouver, Washington area
- Half of available storage for flood protection is in Canadian treaty storage

US Army Corps of Engineers
Northwestern Division

HYDROPOWER

- High flow in spring and summer to aid fish migration has affected the hydropower system's flexibility to meet winter power demands
- Spring and summer voluntary spill for fish has diminished the hydro system's ability to produce power during the fish migration season



US Army Corps of Engineers
Northwestern Division

RECREATION

- 18.5 million people visit Corps sites annually
- Summer reservoir drawdown to augment flow for fish significantly reduced the summer recreation season

US Army Corps of Engineers
Northwestern Division

NAVIGATION

- Inland navigation extends 485 miles to Lewiston, Idaho

US Army Corps of Engineers
Northwestern Division

WATER QUALITY

- Strive to meet state water quality standards and needs for fish
- Extensive monitoring program basin-wide at both Federal and mid-Columbia projects

US Army Corps of Engineers
Northwestern Division

IRRIGATION

- Bureau of Reclamation has primary responsibility for irrigation near Grand Coulee Dam
- The Corps has limited responsibility near John Day Dam

US Army Corps of Engineers
Northwestern Division

COLUMBIA RIVER TREATY

- International Treaty is in place with Canada to meet power and flood control needs
- Treaty storage projects help regulate highly variable flows
- Treaty allows better sharing of resources between two countries.

Mica Dam in Canada

US Army Corps of Engineers
Northwestern Division

FISH AND WILDLIFE

- Twelve endangered fish species
- Year round regional coordination needed to balance the multi-purpose uses of Federal projects
- Under the Endangered Species Act a regional forum was formed:
  - 5 Federal agencies, 5 States, 13 Tribes

Endangered Species Act Operation

OPERATIONS TIMELINE

LIBBY

MINIMUM FLOW OR FLOOD CONTROL

OPERATE TO STURGEON FLOW OBJECTIVES

OPERATE TO SALMON FLOW OBJECTIVES

POWER DRAFT

BURBOT FLOW REQUEST

OPERATE TO BULL TROUT FLOW OBJECTIVES

BURBOT FLOW REQUEST

HUNGRY HORSE

MINIMUM FLOW OR FLOOD CONTROL

OPERATE TO MCNARY SPRING FLOW OBJECTIVES

OPERATE TO MCNARY SUMMER FLOW OBJECTIVES

Variable Draft Limits (Fish VECC)

MINIMUM FLOW FOR COLUMBIA FALLS

GRANDVIEW

Winter Flood Control Elevation

Refill

Full for Summer Recreation

Draft To Winter Flood Control Elevation

Winter Flood Control Elevation

GROUND CREEK

OPERATE TO CHUM FLOW OBJECTIVES

OPERATE TO MCNARY SPRING FLOW OBJECTIVES

OPERATE TO MCNARY SUMMER FLOW OBJECTIVES

OPERATE TO CHUM FLOW OBJECTIVES

Variable Draft limits (Fish VECC)

OPERATE TO PRIEST RAPIDS FLOW OBJECTIVES

REFILL FOR KOKANEE

OPERATE TO VERNITA BAR FLOW OBJECTIVES

OPERATE TO VERNITA BAR FLOW OBJECTIVES

DWORSHAK

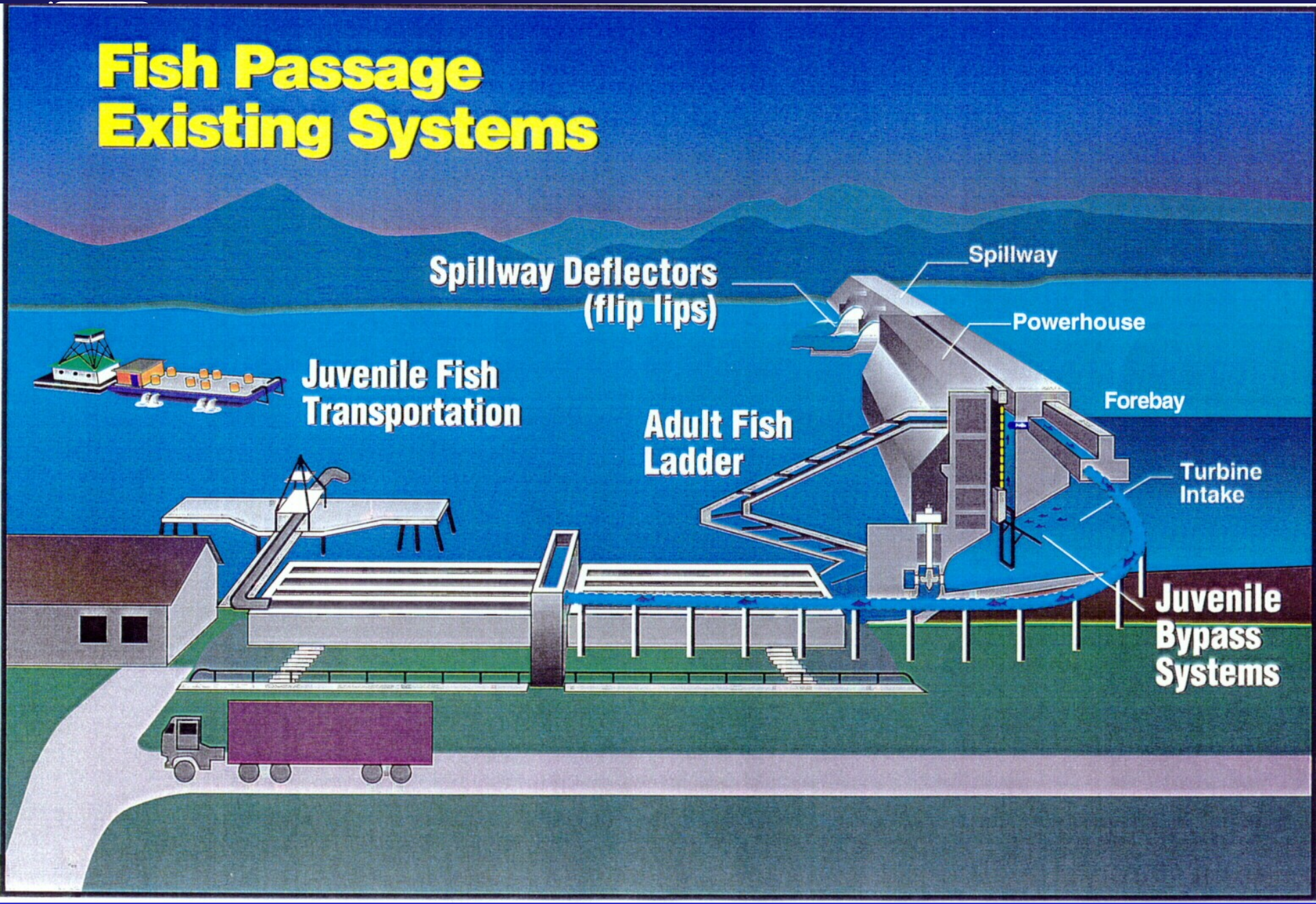
MINIMUM FLOW OR FLOOD CONTROL

OPERATE TO LOWER GRANITE SPRING FLOW OBJECTIVES

OPERATE TO LOWER GRANITE SUMMER FLOW OBJECTIVES

MINIMUM FLOW OR FLOOD CONTROL

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC


Fish Passage
Existing Systems
Spillway Deflectors
(flip lips)
Spillway
Powerhouse
Juvenile Fish
Transportation
Forebay
Adult Fish
Ladder
Turbine
Intake
Juvenile
Bypass
Systems

OPERATION FISH RUN
CORPS OF ENGINEERS

US Army Corps
of Engineers
Northwestern Division